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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,850	12/05/2001	Peggy J. Clews	SD6957S97604	7432

7590

08/26/2003

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EXAMINER

TRAN, BINH X

ART UNIT

PAPER NUMBER

1765.

DATE MAILED: 08/26/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/010,850

Applicant(s)

CLEWS ET AL.

Examiner

Binh X Tran

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-18 is/are pending in the application.
- 4a) Of the above claim(s) 11-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-9 and 11-18 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8-8-2003 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-2, 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liaw et al. (US 6,605,230) in view of Smith et al. (US 6,479,395).

Liaw discloses a method for etching a semiconductor device comprising the step of:

etching the sidewall made of SiO<sub>2</sub> (read on oxide sacrificial material) by immersing the device using an etching solution comprising hydrofluoric acid (HF) and sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) (col. 2-3). Liaw differs from the invention by the specific ratio

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between HF and H<sub>2</sub>SO<sub>4</sub>. However, Liaw clearly teaches the specific ratio between HF and H<sub>2</sub>SO<sub>4</sub> is a result effective variable (col. 2 lines 36-50).

In a method for etching glass (aka silicon oxide or silicon dioxide), Smith teaches to use a solution comprises hydrofluoric acid and a counter acid such as sulfuric acid (col. 7 lines 25-45). Smith further discloses the ratio between the hydrofluoric acid and counter acid (including sulfuric acid) is a result effective variable. In one specific example, Smith discloses the hydrofluoric acid amount ranges 25% to 1 % and counter acid amount ranges from 40% to 5 % (col. 7 lines 30-35). Since Smith clearly teaches the amount of hydrofluoric acid and counter acid (H<sub>2</sub>SO<sub>4</sub>) is variable, any person having ordinary skill in the art would be able to choose any specific amount of hydrofluoric acid and counter acid within Smith's suggested range to have the acid ratio the same as applicants' invention. For example, if one chooses 25 % of HF and 8.33 % of counter acid, the ratio of HF: H<sub>2</sub>SO<sub>4</sub> (counter acid) would be 3:1. If 25% of HF and 25% of counter acid is used, the ratio of HF: H<sub>2</sub>SO<sub>4</sub> (counter acid) is 1:1. Further, the result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal ratio as an expected result.

Respect to claim 2, Liaw teaches the semiconductor device includes at least one polysilicon layer (Fig 1). Respect to claim 5, Liaw discloses that the semiconductor device is used for integrated circuit (read on micro-mechanical and/or micro-electrical-

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mechanical device). Respect to claim 6, Liaw teaches to etch the  $\text{SiO}_2$  material at 0-140 °C (col. 2 lines 57-59; within applicant's range of 5-70 °C). Respect to claim 7, Liaw discloses that HF and  $\text{H}_2\text{SO}_4$  are used in semiconductor process (read on "semiconductor grade"). Respect to claim 8-9, Liaw teaches to use commercial available HF 49% and  $\text{H}_2\text{SO}_4$  96% (col. 2 lines 49-51).

4. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liaw and Smith as applied to claim<sup>1</sup> <sup>1-2 & 5-9</sup> above, and further in view of Gennissen ("Sacrificial Oxide Etching with Aluminum Metallization").

Respect to claim 3, Liaw and Smith fail to disclose the present of the aluminum layer in the semiconductor device. Gennissen teaches a semiconductor device having an aluminum layer. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Liaw and Smith in view of Gennissen by using a aluminum layer because it can be used as an interconnect layer.

Respect to claim 4, Gennissen discloses the etch selectivity for the oxide sacrificial relative to aluminum range form 40 to 680 (within applicant range of greater than 100). Gennissen further discloses the selectivity is a result effective variable (Table 3). The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal selectivity as an expected result.

***Response to Arguments***

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5. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (703) 305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran

NADINE G. NORTON  
PRIMARY EXAMINER

